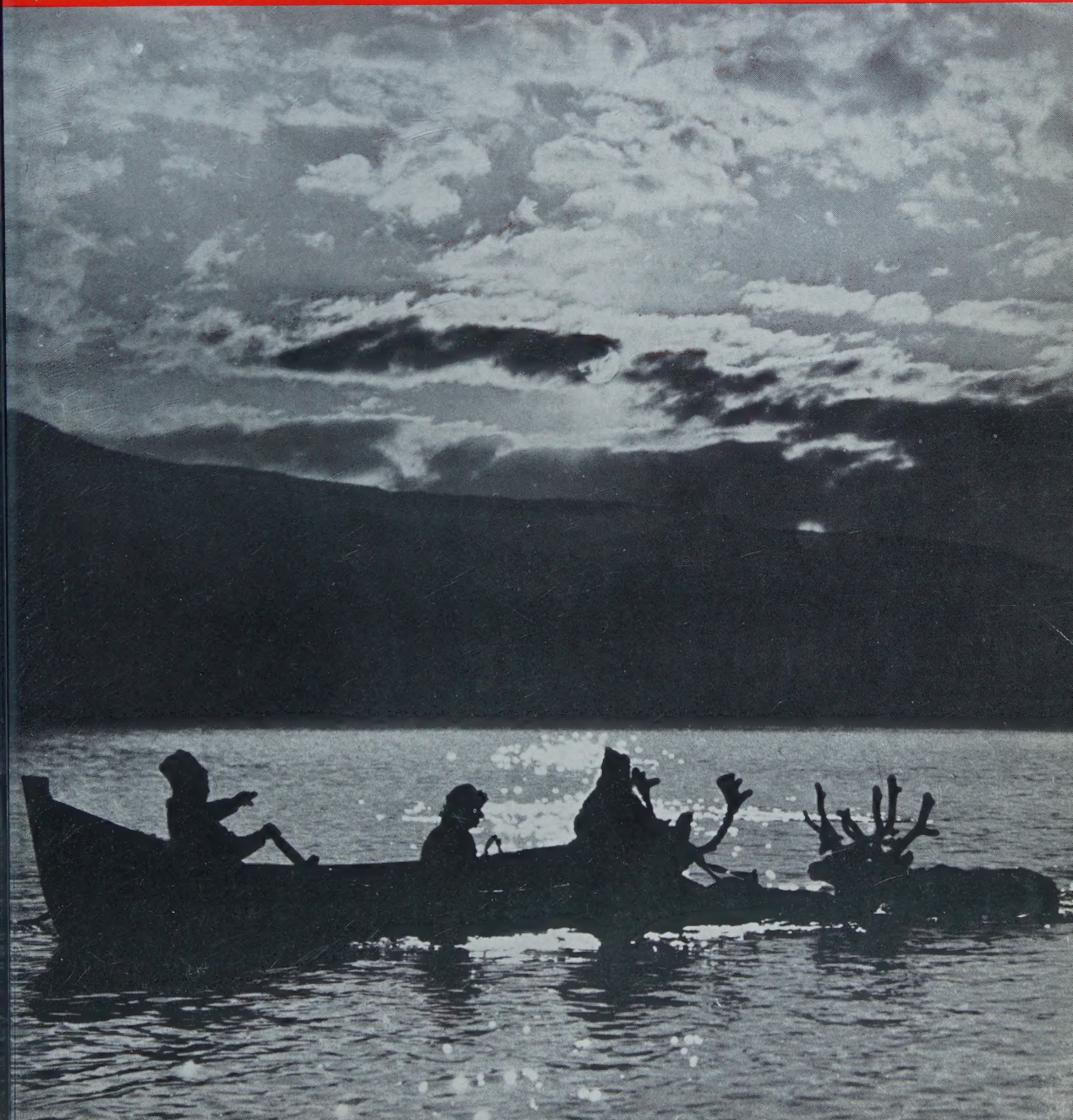


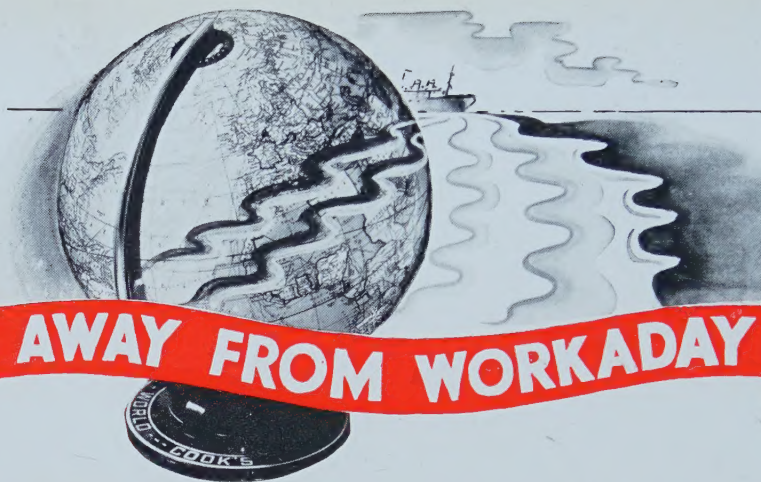
THE GEOGRAPHICAL MAGAZINE

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Concealing Coloration in Nature

by HUGH B. COTT

It is a truism that survival, for all living beings, depends on adaptation to environment. In the following article Mr Cott, of Glasgow University, describes some of the methods whereby our fellow-creatures, under the influence of what we call 'instinct' and of the forces that determine evolution, fulfil this fundamental law. Can we, who pride ourselves on being actuated by reason and independent thought, claim to have achieved a comparable degree of harmony with our surroundings?

THE problem of self-preservation in Nature is very real, very urgent, and often difficult enough to solve. But it is one with which all forms of animal life are faced. Taking a broad view of the subject, individual survival depends upon the satisfaction of two primary ecological needs—food and safety. In a world peopled with potential enemies and pregnant with hunger and the possibility of starvation, if an animal is to survive it must eat, and avoid being eaten; it must live, without being lived upon.

The very diversity and elaboration of Nature's adaptive experiments points to the urgency of this central biological problem of self-preservation. We see evidence of it in the evolution of speed, on land, in the air and under water, by pursuer and by pursued; in the use of stealth and surprise, of deception and ambush, of smoke-screens, traps, nets and parachutes; in retreat obtained by burrowing under the ground, by climbing and living within the shelter of foliage, by the adoption of nocturnal habits; in the development of poison, and of deadly apparatus in the form of fangs and stings for its injection into the bodies of enemy or prey; in the development of plated or spiny armour, or of an intangible but no-less-effective armour of stinking or distasteful secretions, or of that more subtle 'armour' of invisibility afforded by concealing coloration.

Of all these various adaptations, perhaps none are so important, so widely distributed and so highly specialized as those which render animals inconspicuous, and

often well-nigh invisible, in their natural surroundings. It is not too much to say that concealing coloration appears to have been one of the main ends attained in the evolution of animals. The principles upon which it depends, and the methods by which it has been achieved in animals belonging to widely different groups and inhabiting widely different environments, provide material for a chapter of natural history as fascinating as it is remarkable.

Before considering the methods by which various animals are rendered so wonderfully inconspicuous and difficult to recognize, it is helpful to inquire what are the optical principles upon which recognition depends. How is it that we are able to isolate and make out any object from the surroundings which form its immediate background?

When we recognize anything by sight—say, the face of a friend—we are able to do so because it presents a surface differing in colour and tone from that of its background; because this surface is thrown into relief by the effect of light and shade due to unequal illumination; and because the continuity of its surface is bounded by a contour or outline with which we have become familiar. The point to be emphasized here is that visible form can only be distinguished when it is exhibited by differences of colour or tone, or of light and shade. With the reduction of such differences an animal or any other object becomes more and more difficult to recognize;

in their absence it becomes unrecognizable.

It follows from these theoretical considerations that two essential steps towards inconspicuousness must lie in the direction (a) of *colour resemblance*—i.e. the agreement in colour between an object and the background against which it is seen; and (b) of *obliterative shading*—i.e. counter-lightening and shading which abolishes the appearance of roundness or relief due to light and shade. To these must be added (c) the further important principle of *disruptive coloration*—i.e. a superimposed pattern of contrasted colours and tones which serve effectively to break up the real form, which is replaced by an apparent but unreal form, and which thus renders the object even more difficult to recognize.

Now it is a very interesting fact, and one of much significance, that these theoretical principles of colour resemblance, oblitative shading and disruptive coloration, together with various additional devices which make for deception, are those actually found in nature, whereby different animals—fishes and wild fowl, toads and tree-frogs, dabs and crabs, cats and caterpillars and innumerable others—are rendered so extraordinarily difficult to recognize.

One further point must be emphasized at the outset, namely, that it is only when animals, whether frogs or insects or others, are studied in their natural surroundings that it is possible to appreciate the significance of the colours and patterns which they wear, and then only in the living creature when these can be considered in relation to particular postures and habits, and to the habits of enemies and prey. The truth of this will be seen by comparing the hawk-moth *Xanthopan m. morgani* in its natural habitat with a similar insect in the drawer of a museum cabinet, and by realizing that it is inconspicuous in the former situation not only because its wings bear a pattern wonderfully like the bark on which it rests, but because the moth instinctively

rests so that this pattern agrees in alignment with that of the bark, and because the wings are closely applied against the tree, so that no tell-tale shadow is cast on the trunk; and by realising further that the creature rests motionless by day when its chief enemies are abroad, becoming active only under cover of darkness. Similarly, concealing coloration in the aggressor must be considered in relation to, and not apart from, the habitat and habits of its wearer. Just as protective resemblance is very generally associated with special habits such as those mentioned above, so aggressive resemblance is rendered more effective by correlated habits of stealth and cunning—by the noiseless approach below the wind, and by the skilful use of cover and of the element of surprise. Thus Kirby, in his delightful *In Haunts of Wild Game*, says of the leopard: 'Ever on the alert, he soon hears the distant bleating of calves or goats, and ascertaining by the direction of the sound that the luckless animals are a little distance away from the sheltering kraals, he advances quickly but stealthily upon them from below wind. No snake in the grass moves more noiselessly; the long lithe body accommodates itself to all the intricacies of the thorny tangled bush, and the most watchful would never know of its dreaded approach. . . . They charge with lightning speed, and from the smallest bit of cover that one would think barely sufficient to cover a hare.'

COLOUR RESEMBLANCE

The general resemblance borne by various animals to the different surroundings in which they live is a theme more or less familiar to everyone. The ptarmigan nesting on the lichen-covered rock of the mountain summit, the golden plover on the neighbouring moorland, the woodcock among the bracken and fallen oak leaves, the ringed plover on its pebble beach, the stone curlew in its native breckland, the bittern standing motionless among the



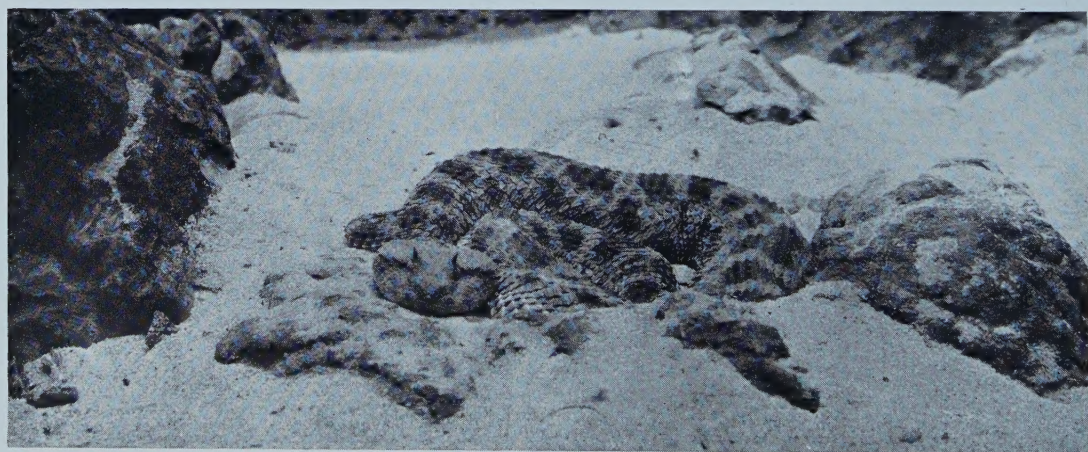
All photographs by Hugh B. Cott

*The hawk-moth *Xanthopan m. morgani* attains protective concealment through the bark-like pattern on its wings which is instinctively placed in alignment with the bark on which it rests*

reeds, the parakeet screaming from the luxuriant foliage of a mango tree, the desert nightjar crouching invisible in a barren waste, the frogmouth perched on some rotten tree stump—each is afforded concealment by the hues demanded of its particular habitat. There are, of course, plenty of exceptions; but the fact remains that in general animals tend to wear on their bodies the prevailing hues of their natural surroundings. The traveller who visits one of the arid regions of the earth, such as the Kalahari, Sahara, or the deserts of North-western India or of Southern California, will look there in vain for the brilliant greens which beautify many tree-dwellers all the world over—parrots and woodpeckers, tree frogs and tree snakes, chameleons and iguanas, grasshoppers and mantids; he will look almost in vain for the blue tints of tunny and mackerel and flying fish which are typical of many inhabitants of the ocean's surface waters; nor will he find there the immaculate white dresses worn by members of the snowland fauna. Instead he will observe that those creatures hardy enough to eke out an existence in such inhospitable places are clad in colours borrowed from the desert itself—ochre, buff, brown and sandy-grey, broken perhaps with patterns of dark

brown, black and white. Moreover, these colours prevail in widely unrelated groups of animals; they are seen alike in the fur of mammals, such as the jackal, gerbille and jerboa; they are seen in the feathers of birds—the desert wheatears and crested larks, the Egyptian nightjar, great bustard, cream-coloured courser, sand grouse and quail; they are repeated on the scales of desert lizards—geckos, skinks, monitors, 'horned toads' and many others, and of snakes like the horned viper, and they occur once more in the chitinous covering of many desert insects. Moreover, many forms are so coloured that they closely harmonize with the prevailing hues of the particular region which they haunt. For example, this is the case with *Phrynosoma*, the horned lizard of California and Nevada, specimens taken on the white desert sand being very light in colour, those from a black lava belt being almost black; similarly with certain grasshoppers in the Canary Islands, which are respectively dark brown, reddish, or sandy in surroundings of these hues, while yet others from the whitish-grey pumice below the cone of Tenerife are themselves almost white.

The only other major habitat where somewhat similar colours predominate is one the very opposite in most respects from



The sandy colour and brown pattern of the horned viper (Cerastes cerastes) blend with the desert wastes which the creature inhabits



Concealing coloration alone is not sufficient to afford concealment. This white cock, photographed out-of-doors in natural diffused daylight, stands out conspicuously against a white background

the desert, namely the mud of estuaries and the sandy and gravelly bottom of inshore seas. And here again the fauna, though so entirely different from that we have been considering, wears the same sober hues of brown and orange, yellow and grey, such as are seen in flatfish like the flounder and plaice, and in many crustaceans. Here, too, we find that the colours and patterns worn are not indiscriminately brown or buff or yellow, for there is generally a marked colour-harmony be-

tween the flatfish and the particular bottom on which it rests—the resemblance in this case being partly due to a temporary physiological adjustment brought about by the contraction or expansion of ‘chromatophores’ in the skin.

OBLITERATIVE SHADING

The second principle, known as oblitative shading, depends, as we have seen, upon the fact that in nature the upper surface of animals, like that of other objects seen in



Bush buck. An example of obliterative shading, the effect of which is greatly to diminish the appearance of solidity or relief. White spots on its flanks blend with the flecks of sunlight

the open, is more brightly illuminated than the under parts, due to illumination from the sky. The effect of this top-lighting is to lighten the tone of the upper parts, while the lower surfaces which are in shade appear to be darkened. This is why the white cock in the accompanying photograph (p. 77) appears conspicuous *even when seen against a white background*, the back appearing lighter, and the breast darker, than the background, although in actual fact back, background and breast are all pure white. If instead the bird were coloured a uniform brown tone, and viewed against a background of exactly similar tone, it would likewise appear conspicuous. But with brush and paint it would be an easy matter for an artist to darken the back and lighten the under surfaces so as exactly to counteract the effect of light and shade.

This treatment would render the bird almost completely invisible from a short distance away. Now it is this very principle which has been adopted for the concealment of many wild animals. The brush of Nature has laid down in skin and scale, in fur and feather, darker pigments on the back and lighter pigments on the belly. In this way a further important step is taken towards the obliteration of form. The effectiveness of the scheme is increased by the illusion of *flatness* caused by the elimination of relief. This principle is nicely illustrated in the photograph of a bush buck. At a little distance the creature loses all appearance of solidity, an effect which is enhanced by the white markings on the flanks. These resemble flecks of sunlight, and, as it were, carry the eye of the observer through the optically

flattened surface of the body to the light-flecks that lie beyond. The coat of the hare has a similar grading of tone from dark above to light beneath. As she crouches motionless in the field she is difficult enough to detect; but look at the difference when, having been killed, she lies on her side or back. The compensating effect of light and shade is now upset; the illusion is destroyed; and in death she becomes as conspicuous as in life she was difficult to see.

Obliterative coloration occurs widely in nature: it has been evolved alike in many unrelated groups of animals; by the hunter and the hunted; in the sea and on land. It tones the canvas on which are painted the jaguar's spots, the tiger's stripes and the patterns of smaller carnivores such as cervel and ocelot. It is the uniform largely adopted by rodents and ungulates. It forms a background to reveal the subtle picture patterns worn by innumerable birds. It is the basic livery of various snakes, lizards and amphibians. Many fishes, especially such forms as swim actively in the surface waters of the sea, likewise have their forms obliterated by counter-shading. Tunny and mackerel—pursuer and pursued—may be cited as examples. Such colour schemes are effective when the animals wearing them are viewed from the side. But the dark back and silver belly so characteristic of many fishes also evidently reduce visibility in another way—that is when the creatures are seen from above or from beneath. For the back will tend to harmonize with the deep colour of the sea (or it may be with the river bottom) when sought by an enemy from above, while from beneath the silver belly will bear the nearest approach to the bright surrounding background of sky.

DISRUPTIVE COLORATION

We have seen that under ideal conditions colour resemblance combined with obliterative shading would suffice to render

an animal absolutely invisible at a short distance. But in nature conditions never remain ideal, for they change. Most animals are active, and their movements bring them before a constantly varying background; moreover, the light which falls upon them itself varies in colour, intensity and direction. Such difficulties as these are met with extraordinary success by the third principle which underlies animal camouflage—namely, disruptive coloration. When a pickpocket intends to relieve you of your watch or purse, he, or his confederate, takes care to distract your attention by creating a diversion. He draws your eyes from what is really happening to what seems to be happening. Now the patterns worn by many animals such as anacondas and iguanas, ringed plovers and woodcock, and various grasshoppers and grass-frogs operate in a somewhat analogous way. Distributed over the body are irregular patches of contrasted colours and tones. These patches tend to catch the eye of the observer and to draw his attention away from the underlying form of the animal which exhibits them. The patterns themselves may be conspicuous enough, but they blend with and often pass for part of the environment, in the same way that the pickpocket's tactics of bluff pass for a commonplace incident.

Even the simplest disruptive patterns tend to make for concealment. Certain South American toads, themselves dull greenish or earth-coloured creatures, wear a conspicuous yellow stripe extending from the snout right along the middle of the back. So far from drawing attention to the animal, however, the effect of this stripe is the reverse—to break up the form of the toad, so that the eye of an enemy is presented with two half toads, and as likely as not the brain behind the eye fails to join them together in recognition. Anyone who doubts the extraordinary efficiency in nature of disruptive patterns is referred to the photograph of young woodcock (p. 80). How many are there?



Seen against the irregular patchwork of fallen leaves and shadows, young woodcock provide a puzzle for the sharpest eye



Responding to the warning cry of its parents, the young ringed plover, effectively camouflaged by nature, squats motionless when in danger

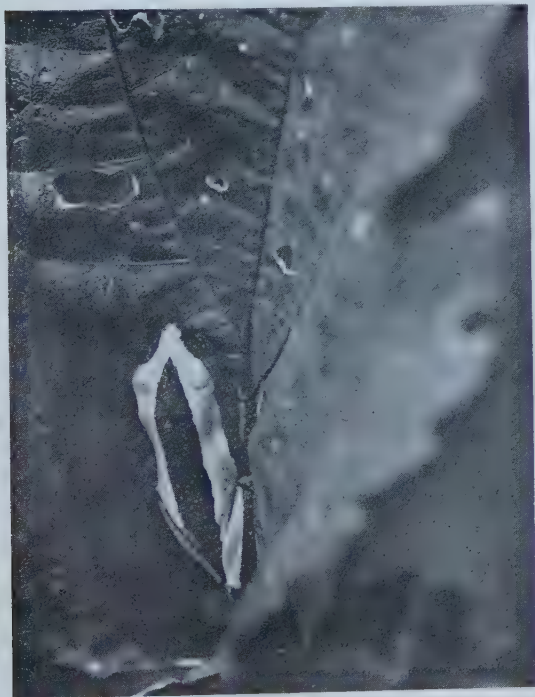


The principles of colour resemblance and disruptive coloration are exemplified by the common snipe—



—and the woodcock brooding at the nest

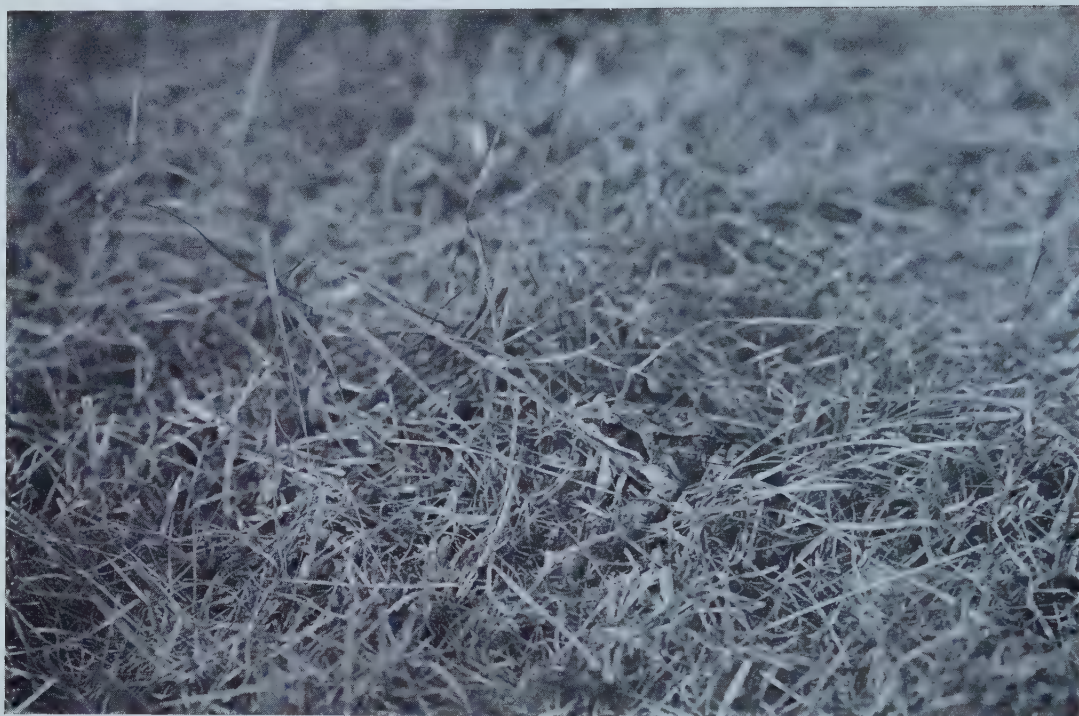
Such patterns as we have considered are successful because they appear to *break up the continuous surface of the body*. But this principle is carried even further in the case of certain animals where the pattern appears to *join together separate parts of the body*. The little East African tree frog *Megalixalus fornasinii* is a case in point. When seen in the characteristic resting attitude, with the limbs closely applied to the sides, it will be noticed that the broad and very conspicuous silvery dorsal stripes exactly coincide with similar stripes on the hind legs. The attitude and the very striking colour scheme combine to produce an extraordinary effect, which, like the 'dazzle' painting of war time, tends to make the object look other than it really is. The deceptive appearance depends upon the breaking up of the body into two contrasted areas of brown and white. Considered separately, neither part resembles part of the frog.



Megalixalus fornasinii, an East African tree frog. The conspicuous white stripes divert the attention of an observer from the frog which wears them

Together in nature the white area stands out and distracts the observer's attention from the true form and contour of the body on which it is superimposed and, like a veil obliterating the features of its wearer, effectively masks its identity.

A special application of this principle is seen in the camouflage of the eye itself—that most difficult of all organs to conceal; and it is interesting to note how this end is attained in different animals. In many nocturnal geckos, and in snakes like the horned viper, the pupil when contracted in daylight becomes a mere slit, and the iris is of a tint which matches the rest of the head. On the other hand many fishes, frogs, birds and mammals have large round black pupils, and it is not surprising to find that Nature, the supreme camouflage artist, has dealt with this problem in detail. What makes an eye especially conspicuous is its roundness, for of all shapes a round disc is the most striking and easily seen and recognized—hence the use of the 'bull's-eye' for target practice. But if the eye, and particularly the conspicuous black pupil, can be made to appear another shape, then it will cease to resemble an eye. This effect can be brought about by enclosing the eye in an irregular patch of dark pigment so that it passes for part of the pattern which surrounds it. This is well shown in the common frog *Rana temporaria* (p. 84), where a blackened area, level above with the top of the pupil, extends across the iris and continues over the skin on the side of the head as a dark patch of colour, which effectively masks the eye and also the head in which the eye is set, for it looks like an interstice between grasses, the effect being intensified by the strongly contrasted adjacent light streak which borders the lip. In other cases, especially in many fishes such as the sergeant fish (*Rachycentron canadum*) and fifteen-spined stickle-back (*Gasterosteus spinachia*) and in certain newts, salamanders and lizards, a dark stripe (often the same width as the diameter of the pupil) extends from the



Colour-harmony, obliterative shading and a characteristic pattern are combined in the camouflage scheme of the common frog; a dark patch masks the eye



Haetera diaphana, a Brazilian butterfly on whose transparent wings are conspicuous 'eye-spots'. The right wing bears the mark of a bird's beak

pupil across the iris, and is continued as a lateral stripe along the side of the body over scales or skin. In other fishes, like the angel fish (*Pterophyllum scalare*) and butterfly fish (*Chaetodon unimaculatus*), the stripe is vertical instead of horizontal. A some-

what similar arrangement is found in birds like the snipe, bittern, stone curlew, and ringed plover, and among mammals such as the gemsbuck, roan and sable antelopes, where a dark tract of feathers or hair masks the eye. Finally, certain large-eyed nocturnal birds, notably the frogmouths (*Podargus*) and nightjars (*Caprimulgus*), which number among the most wonderful examples of concealing coloration, rest by day with almost closed eyelids, and thus hide the eyes from view.

Before leaving the question of eye-camouflage, we must refer in passing to the so-called 'eye-spots' or false eyes which appear near the wing margins of many butterflies and on the sacral region in various frogs. These dummy eyes are believed to have a directive function; that is to say, to be of value in diverting the attention of enemies away from the vital parts and from the *real* eye. That this is the case is



The common carpet moth well illustrates the effectiveness of a disruptive pattern in breaking up and destroying a familiar outline so as to conceal its owner



Oak beauty moth (Pachys strataria) at rest on the lichen-covered bark of an oak

CONCEALING COLORATION IN NATURE

shown by the impression of a bird's beak which is often found near these directive markings on the wings of freshly caught butterflies.

Many disruptive patterns, like those of tiger, leopard, curlew, ringed plover, woodcock, snipe, common frog and common carpet moth (p. 85) are fairly unspecialized. But others bear a close resemblance to a special environment. In fact such animals seem to wear on their bodies a detailed picturing of their normal habitat-background—of bark or lichen, of grass or heather, of coral or seaweed. For example, in every continent there are innumerable animals—moths, beetles, spiders, tree lizards and others—which resemble lichen-covered bark. Such, for instance, is the oak beauty moth.

Cases like these lead on to others, in which the resemblance is carried yet further, and in which the animal looks like



The leaf butterfly, Kallima (above), is a classical example of 'special protective resemblance'. The leaf-like object in the centre of the lower picture is the back of a South American toad—Bufo superciliaris—its eye (at the left-hand end) hidden by the shadow of a fold of projecting skin



Acrida sulphuripennis, a grasshopper photographed in Portuguese East Africa in the grass which forms its natural habitat. Wearing a disruptive pattern of green and pale buff, the animal (seen on the right of the picture) is extremely difficult to detect in nature

some definite object in the environment—a leaf, a twig, a flower or the excrement of a bird. Observations on the habits of some of these creatures, such as the angler fish *Lophius piscatorius* with his line and lure, or the flower-like mantis *Idolum diabolicum* waiting in ambush for insect-prey, read almost like fairy tales. But here we must call a halt: we have left the realm of concealment for that of bluff and deception.

In this short review of some of the principles which govern the coloration of ani-

mals, we have but touched the fringe of a great subject. The wide application of these principles among diverse classes of animals, in widely different environments, and in almost every habitable region of the globe, points to the importance of concealment as a factor in the maintenance and preservation of innumerable forms of animal life. The methods by which this end is approached are themselves diverse, ingenious and often extraordinarily successful—how successful those know best who know Nature best.

Pagan

by E. H. M. COX

By way of contrast with the series of articles on the growth of modern cities, The Geographical Magazine will publish from time to time descriptions of other cities which—like Pagan, that grew and flourished for a thousand years—remind us in their magnificent ruin that our civilization also is not immortal

THE East is full of deserted cities. Where there are remains above ground they are usually of religious buildings, as conquerors almost invariably respected the sanctity of religion, however destructive they may have been to the life and property of the lay public. Anuradhapura and Polonnaruwa are examples in Ceylon, Angkor in Cambodia and Pagan in Burma. Of these, possibly the last is the least known, for, with the exception of the Ananda Pagoda and one or two others, it lacks the finished architecture and decoration which are such striking features of the deserted cities of Ceylon and Indo-China.

What is so amazing about Pagan is the

enormous area in which pagodas and temples in various stages of decay are to be found and the prodigious number of the remains. The deserted area is almost 100 square miles, stretching 20 miles along the east bank of the Irrawaddy a few miles south of the junction of the Chindwin and the main stream. Even today the remains of over 5000 stupas, pagodas and temples are to be found. It is difficult to imagine what the city looked like before A.D. 1280 when 1000 large stupas, 10,000 smaller ones and over 4000 square temples were dismantled by King Tarokpyemin to provide material for fortifications against the army of Kublai Khan.

Large though the city undoubtedly was, it would be ridiculous to imagine that a town with streets and houses filled an area of twenty miles by five. No doubt the name Pagan was loosely used to cover a tract which consisted of a main city and many outlying suburban villages. The reason for the wide spacing of many of the main pagodas is known. Superstition swayed many of the royal acts; a flight of birds and their settling place determined many of the sites. A still commoner practice was to place a holy relic on the back of one of the royal white elephants, which was then turned loose. The first place where the beast stopped to graze or rest was considered extremely propitious, whether it was 200 feet or 5 miles. Nevertheless Pagan must have been a noble capital. It lies in what is now the dry belt of Middle Burma, where the heat is intense, but there is reason to believe that the climate has changed, as indeed it must have, because





All photographs by E. H. M. Cox

Pagan was the capital of Burma from the 2nd to the 13th century A.D., when the kingdom was overthrown by Kublai Khan. While all secular buildings were destroyed centuries ago, the remains of some 5000 of the 15,000 religious edifices which Pagan is said to have boasted can still be traced





The Bupaya or Pumpkin Pagoda (above) was built about A.D. 200 by King Pyusawdi to commemorate the eradication of a weed that was ruining cultivation. The Nanpaya Temple (below) is reputed to have been originally used as a palace by Manuha, an 11th-century king





At various times architects from China, India and Ceylon were employed. The Nagayon Pagoda shows Indian influence



The centre of what was one of the great cities of the East at the time of the Norman Conquest. The white pagoda in the background, the Ananda Pagoda, was built in 1091



A combination of monastery and pagoda built by King Alaungsithu in 1144, incorporating, in its various storeys, the monastery, a shrine for the figure of Buddha, a library and a sanctuary for holy relics



So many religious currents were attracted to Pagan that almost every type of Buddhist architecture can be traced there. A pagoda in more flamboyant style, built towards the end of the Pagan kingdom



The entrance to the same pagoda. The use of massive decoration was at its zenith by the 13th century and is in striking contrast to the simplicity of the earlier buildings

the neighbourhood today could not possibly support the population of a great city.

The early history of Pagan is more or less unknown. It is supposed to have been founded in A.D. 108. The walled city was built by Pyinbya in 847, but its chief glory was from 1044 until its destruction in 1287. During this period it was ruled by a dynasty which was called the Temple Builders. For us much of its interest lies in its religious history, for at one time or another it has been bound up with almost every branch of Buddhism. Prior to 1056 religion was controlled by the Ari priesthood, a distinct development of Tibetan Buddhism with many of its objectionable practices, including *droit de seigneur*. Then in 1056 appeared Shin Araham, a monk of the southern school and one of the world's great evangelists, who soon overthrew the power of the Aris. It was during his primacy that the craze for building temples commenced. Later there was increased intercourse with Ceylon and a corresponding influence on religious architecture, while Northern India also contributed when devout Buddhists were driven out of the country by persecution and found a welcome at Pagan.

Thus it is possible to trace almost every type of Buddhist architecture. The earliest and best types are the simplest in design and ornamentation. They were almost all built of stone. Later, owing to the difficulty of getting suitable material near at hand, brick became more and more common. The kings tried to keep up the standard of craftsmanship, as is instanced by the strong tradition that

King Narathu executed master-masons because a needle could be inserted between two bricks, but in time this deteriorated; designs became coarse and workmanship slovenly; but still the building went on and on. More stupas were produced each year, of various shapes and sizes. Rarely has the world seen such an orgy of religious building.

The secular history is of little interest to us. It differed little from the usual history of the East—court intrigues, the massacre of all relatives as each king came to the throne, the gradual decadence of the descendants of Kyanzitttha, the greatest king of the dynasty, until the end was reached with Narathihapate, or Tarokpyemin, 'the king' who fled from the Chinese', a foolish glutton, whose greatest boast was the possession of three thousand concubines. Owing to Marco Polo the destruction of the Pagan kingdom of Burma by the army of Kublai Khan has gained a fictitious importance. It was really nothing more than a frontier war caused by the foolish king killing some Chinese ambassadors. Most of the Chinese army consisted of Yunnanese levies stiffened with a small force of Tartar cavalry, but it was quite sufficient to destroy a decadent kingdom.

And what is left today? A few magnificent temples kept in repair and thousands of others decaying very slowly in that dry and hot climate. With the help of a little history and imagination it is not difficult to realize its past greatness. Civilization owes the kings of Pagan something for having preserved to a great extent Theravada Buddhism, one of the purest of all faiths.



All photographs by Martin Hürlimann

Indochinese culture has long been centred in the Buddhist monasteries. A novice of Siamese Laos



A young dancer in the Siamese royal ballet, exponent of one of the oldest arts of Indochina



A Siamese of high rank : the Director of the King's Ballet.



A youth from one of the many tribes that compose the Shan states of Burma



Among these the Karens—primitive and animistic in their beliefs—form a distinctive element



The Padaungs—another Shan people—are also more addicted to animism than Buddhism



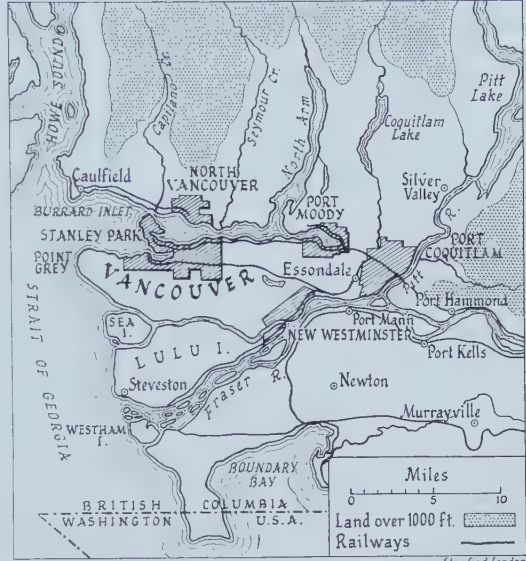
The Padoong women's dress is as striking and elaborate as the men's is dull



The Buddhist monk in Burma can rely on a full begging-bowl despite the prevalent animism

Vancouver's 50th Anniversary

Vancouver has chosen Dominion Day (July 1) for the official celebration of its Golden Jubilee, though the city was actually incorporated on April 6, 1886. It then had 2000 inhabitants. Today the commercial metropolis of British Columbia, with a population of 300,000, is the third largest city in Canada and one of the great ports of the Pacific, leading the world in winter grain shipments and maintaining a wide range of industries. Nearly 12,000,000 tons of shipping clear from it annually: the vessels of 55 deep-sea lines make it a regular port of call. Two events have chiefly influenced this amazing growth: the coming of the transcontinental railway and the opening of the Panama Canal, which reduced the all-sea route from Vancouver to Liverpool by nearly 6000 miles. The following photographs give some measure of Vancouver's proud achievement and destiny



All photographs by courtesy of the Agent-General for British Columbia

Burrard Inlet, looking northwards from Vancouver. On June 13, 1792, it was entered by the young English naval captain—formerly one of Captain Cook's companions—whose name the city bears



Not until 70 years after Vancouver's visit was the first white settlement established, beside the placid waters he saw, by three Yorkshiremen whom the finding of gold up the Fraser Valley had brought across the Atlantic. The site of their clearing, near which the village of Granville grew up, is now the heart of Vancouver city, here seen from the same point in Stanley Park





A forest scene on the Burrard Inlet shore in 1868-70 illustrates the difficulty of the task which confronted the pioneers when they began a survey for the street system of the proposed city. A principal thoroughfare, Granville Street (below), now runs where a peep hole, one mile long, was hacked out of the forest by the survey party





A disastrous fire destroyed, in the space of the single night of June 13, 1886, soon after its incorporation, the whole of the first, wooden, town. Even in 1887, when the new city was building, the streets were little more than 'dirt' tracks among the tree stumps



Approximately the same aspect fifty years later. The C.P.R. freight yards are in the foreground



The arrival of the first transcontinental passenger train at Vancouver on May 23, 1887, realized a dream long cherished by Canadians. Canada, from coast to coast, was united, and Vancouver's splendid harbour became an outlet for the vast resources of the western prairies and mountains



Vancouver harbour—48 square miles in extent—has a total shore-line of 98 miles

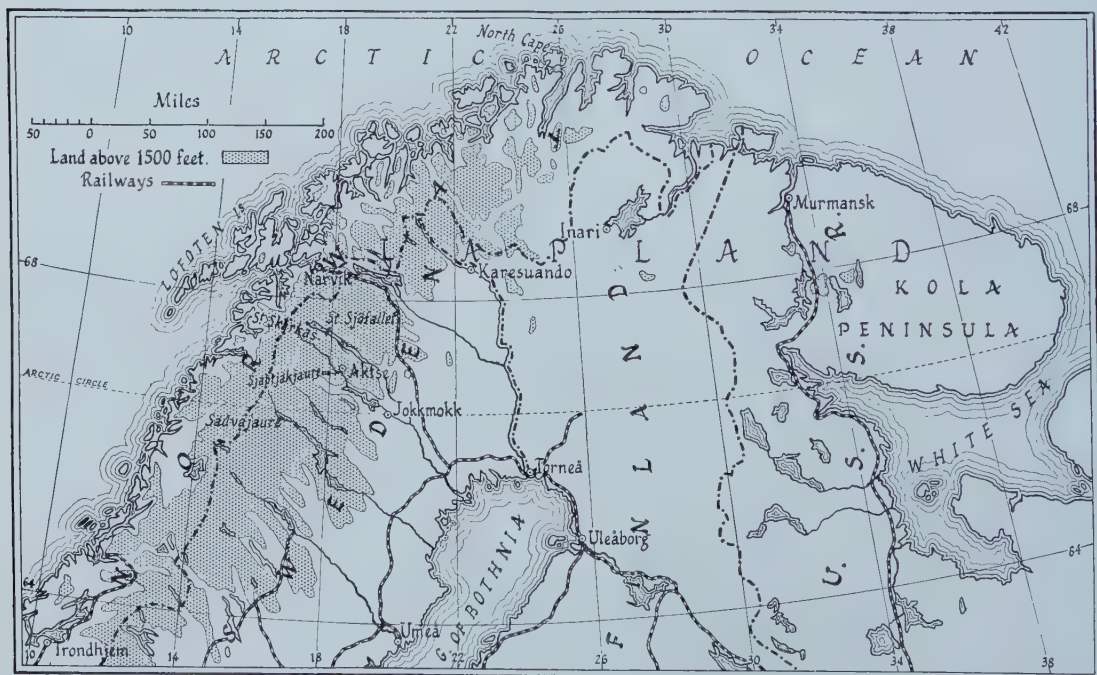
Life on the Tracks of the Reindeer Herd

by EVERARD R. O. KOEBEL

To share the hardships of a true nomad existence, exposed with little shelter or comfort to the rigour of the elements, demands courage and determination from children of the 'settled ones'. Mr Koebel, who has done so on five occasions, rewards us with a vivid picture of the life that centres round the romantic creature made familiar to the peoples of Northern Europe by that ancestral myth which associates it with Father Christmas

LAPLAND is divided between four countries—Norway, Sweden, Finland and Russia—without forming an administrative or political unit of any kind. In ancient times Lapland might have been defined as 'the territory which is inhabited by the people called Lapps', but nowadays a definition has to be limited to 'the territory where Lapps are found', as civilized man has taken possession of the greater part. Hence, even at the outset of our investigation, we must direct our thoughts from the country to the people, since they are obvi-

ously its essential part, unique in their nomad life, their wizardry, their tales and songs, their splendidly coloured clothes, and last, but not least, in their true morality. But neither can we confine our attention to the people themselves. As sailor life cannot be comprehended without considering ships, nor the hunter's life without learning something about game, the Lapp cannot be understood without considering the reindeer. Around these animals everything in Lapp life revolves.



Stanford, London.



By courtesy of the Swedish Travel Bureau

To the winter camping-grounds in the forest the Lapps come at the end of November with their reindeer sledges. Smoke is soon pouring from the open tops of their kote or tents

More than a thousand years ago the Lapps succeeded in converting the reindeer, by virtue of its strong herd instinct, into a kind of domestic animal. Ever since, the Lapps have lived a kind of parasite life with the reindeer, concentrating their intelligence upon its herding, and producing in it, through many centuries of experience, a marvellous degree of perfection. Nowadays we have to distinguish between genuine Lapps—those who still own and herd reindeer—and impoverished ones who settle as fishermen and, living in the neighbourhood of the Scandinavian farmer-colonists, become farmers themselves. The reindeer Lapps form, so to speak, the 'gentry'. They are further divided, with the two different kinds of 'tame' reindeer, into highland Lapps and the now almost extinct forest Lapps. Besides the highland and forest reindeer there exists a third species, idealized and even

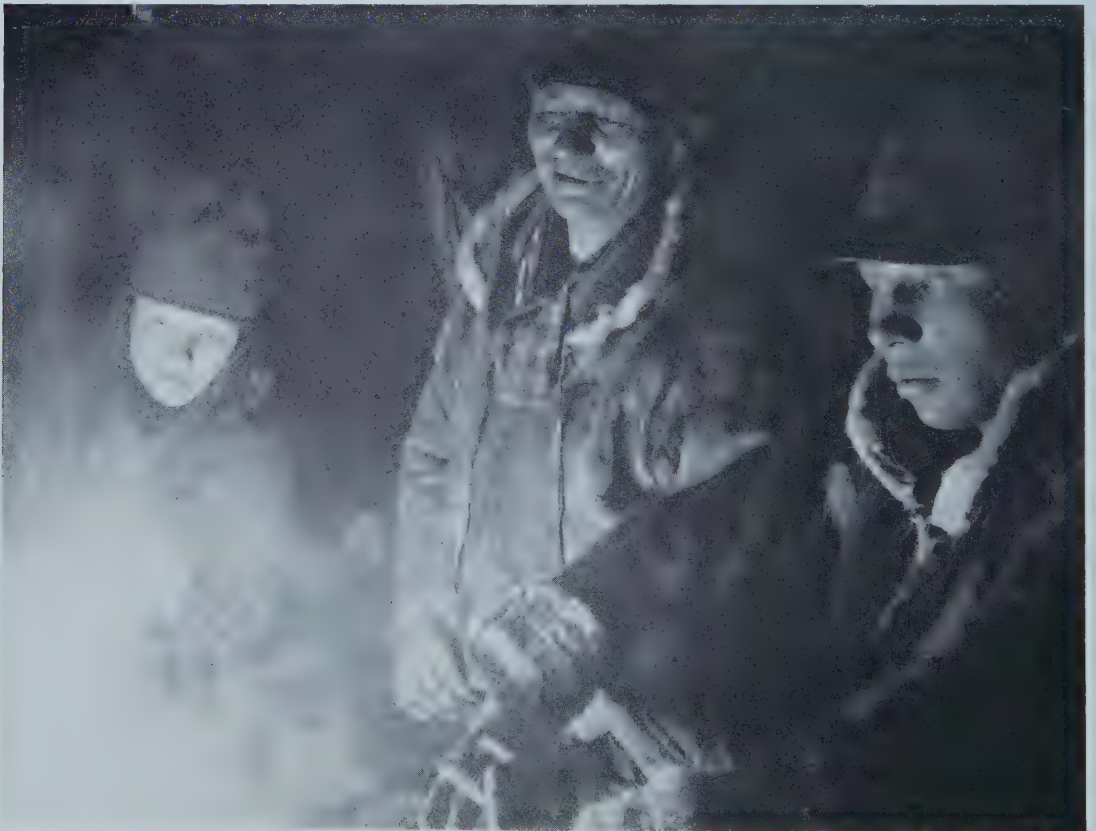
idolized by every Lapp—the wild reindeer, which has now almost become extinct in Scandinavia as a result of indiscriminate shooting and absorption in tame herds. The majority of all reindeer-herding Lapps breed the highland reindeer, which is famous for its strong migrating instincts, comparable with those of birds of passage.

For centuries the same type of nomad tent, the *kote*, has been used as a dwelling. It consists of an ingenious arrangement of bent and straight poles which can very easily be transported, fastened either on to a little sledge or, in summer, to the side of a pack-reindeer, and dragged along the ground. This wooden tent-frame is extremely stable, though frequently exposed to violent gales. The cover consists of black cloth bought from 'settled folk'. In earlier times even that might have been of reindeer skin. I must confess that more than once I trembled as I lay in my sheep-

skin sleeping-bag, expecting every moment that the autumn gale would snap asunder the neat trestle around which our only protection, the tent cover, was fixed. This, however, happens very seldom, the construction providing the utmost stability. The round tent has in the top a hole, three feet in diameter, as an outlet for the smoke. This is open all the year round, except during heavy rain when a special cover is laid over it. Everybody is anxious to reopen the smoke hole as soon as possible, as the tent quickly fills with smoke, causing tears to flow freely.

The fire in the middle of the Lapp tent requires heaps of firewood, which can be taken from the forest at will. For lighting and starting the fire, birch bark is used

exclusively, for it burns very readily, even when wet. Consequently, birch bark plays a special rôle in Lappish imagination; it is a beneficent mate which helps men to get fire, truly the most vital element in arctic life. In spite of the terrible cold of 40, 50 and even 60 degrees of frost, the fire is never kept burning during the night. On account of the open roof the temperature inside is the same as outside. A part of the body exposed to a cold of minus 50 degrees becomes frozen in a few seconds. When asleep, therefore, people must be carefully protected by sheepskins, fur gloves, a fur cap drawn over the ears, and a woollen cloth over the face. As a kind of hot-water bottle they like to take a dog into the sleeping-bag. It is much easier



Round the fire that always burns inside the kote the Lapps spend their evenings. Here is a Jokkmokk girl with two Karesuando. These are the two main divisions of the Swedish Lapps



Everard R. O. Koebel

The periodical 'segregation' of the reindeer is an important affair. The reindeer are herded into a birch enclosure surrounded by the 'offices', where each owner collects his beasts as they are lassoed

to protect people of mature age than small children, who often cry ceaselessly because of the intense cold.

Anyhow, the Lapp people bear their fate with a laugh and a joke. In spite of the physical pain, the loneliness and a constant feeling of impending calamity, even I could not help being amused by certain experiences of the cold. The whole country was turned into a region of stiffness and rigidity. Everything was frozen hard: the meat was as sharp as iron, the milk had to be put in lumps into the coffee, the blood saved for dog-food had to be carefully cut into pieces with an axe (carefully, so that the axe itself shouldn't break), the wood lost all its resilience and became as brittle as glass. Only a small circle around the tent fire formed a zone of plasticity. There a frozen salt fish, more like a steel weapon than human food, could be transformed

into a delicacy. But on the coldest day I experienced in a Lapp tent, not even this was easy of accomplishment, as the fish, fully cooked on one side, was still frozen on the other. This often set me laughing, and the Lapps, always ready to seize on any cause for laughter, shared my amusement.

In Swedish Lapland, where I lived together with nomad Lapps, the herds, kept during the winter in the lowland forests round the Gulf of Bothnia, rush upwards in early spring towards the highlands. That is the most strenuous time for the Lapps. The longing of these reindeer for the highlands has enfeebled them to such a degree that to slaughter them in their emaciated condition would be merely waste. Consequently, the enfeeblement is transmitted to the men. Besides, the spring brightness causes serious eye diseases.

The arctic winter night had been accentuated by the darkness of the protective forest in which the Lapp tent was situated for several months. The Lapp eyes had thus, through constant activity in the dark, slowly become like lynxes'. Now they are exposed to dangerous dazzlement by the sudden change to spring sun and its reflection in ice and snow. Furthermore, the speed of the homeward-running highland herd is so tremendous that the Lapp with his teams of sledges can hardly keep pace with them, and perhaps loses trace of them altogether the first time the men halt for a rest. In that case he may not see his herd again before he himself reaches the highlands. But if he once releases his sledge reindeer even for a night—as he is accustomed to do to let them bore holes to feed on the reindeer moss underneath the snow, he is never sure that the entire herd, including these, will not continue migrating by itself, leaving the master behind with a dozen heavy sledges and a couple of crying children. Finally, when the caravan comes to climb up the intermediate mountain chain on which, about 3000 feet up, the spring camping-ground is situated, the tired draught reindeer may become entirely exhausted. No wonder, then, that the Lapp is more than happy when he has safely reached the spring camping-ground on the upper edge of the birch zone, and can view with contentment the lakes and endless forests of the Swedish lowland where he came from.

At the spring camping-place he waits for the snow to finish melting. Still not more than half the summer migration route has been traversed. In the west the snowy Norwegian heights, where the Lapps have their midsummer residence, beckon. The sledges are deposited near the spring camping-ground, and the second part of the migration has to be managed with teams of pack reindeer. This journey, walking all the way, is still more exhausting, especially for old people. Sometimes they are unable to follow any longer and

are left behind, as there is nobody to care for them: the men have to drive the herd and to keep it together and the women have to guide the teams and see to the children. These, if still in the cradle, are fastened at one side of a pack reindeer or, if they are bigger, carried on its back. The first duty of the people in the prime of life is to take care of the all-important animals, and thus when the old are left behind they often die, in some remote vale or quite alone sitting on a mountain slope.

All along the summer migration path and on the summer camping-ground no tree is to be found. The difficulty of making fires is overcome by using tiny juniper and willow brushwood which grows where ravines afford protection against the roughness of the climate.

The herd is usually released on a mountain or plateau where nature helps in keeping it together. Every day, or at intervals of two days, the Lapp goes with his reindeer-dog to assemble the herd. He usually finds his animals pasturing in a number of little groups spread over a wide area. Reindeer are shy like red deer or other game, and when the tourist meets them he may often think, "How can these animals be herded, like sheep and cows?" The reindeer do, in fact, run away as soon as they become aware of the herdsman's approach; but their instinct to congregate then comes into play and enables the Lapp to collect his property. The single groups fly in the direction where they know they will find some comrades, and in this way quickly form a herd of 700 or even 1000 head. Once together, the reindeer are no longer shy. The swift Lapp dog prevents their spreading again, and drives them in the direction his master orders. When several Lapps are collecting a herd, one may lasso an animal which the bulk of the herd is accustomed to follow and which is belled, and lead it by a halter. Usually, the herd can now be led to the Lapp tent, where various duties have to be undertaken. Reindeer cows are milked, their

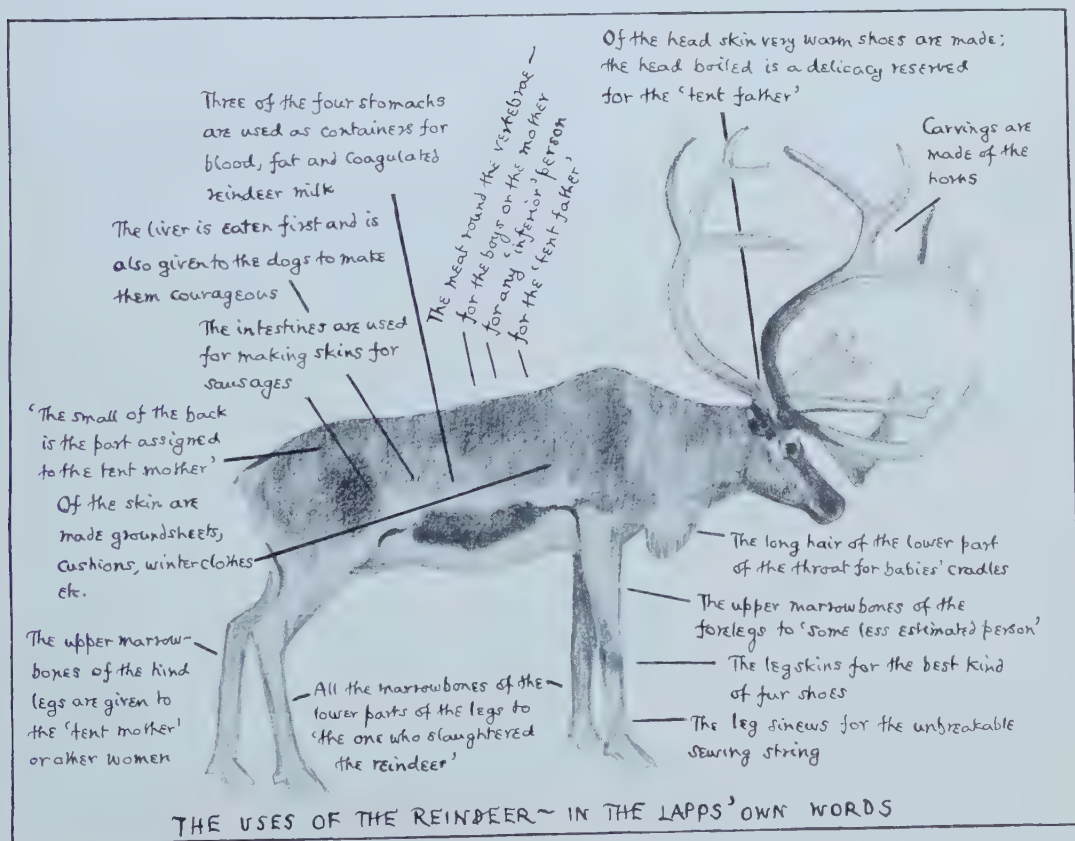
LIFE ON THE TRACKS OF THE REINDEER HERD

calves marked with the owner's sign by cutting a particular combination of notches in their ears; some bulls have to be castrated, and others withdrawn from the herd for slaughtering after it has left again for the mountain pastures.

The reindeer is fully utilized, although it cannot be stated that nowadays Lapps use nothing but reindeer products, as the ancient Lapps certainly did. Spoons, knife-cases, tiny looms, lasso-rings, 'needle-tents' (needle-cases made in the shape of tents), etc., are carved out of the horns; the hides cover the ground inside the Lapp tent and are fashioned into fur clothes; the skin of the skull is converted into a warm kind of fur shoe, while the highly valued leg skins are used for the best kind of shoes; the sinews are converted, by a strange process of chewing done by the women, into the famous indestructible

Lappish sewing strings; each of the four stomachs which a ruminating animal possesses is used as a container: one for fat, another for a preparation of sour milk, the third for herbs collected on the highland, and the fourth for curdled blood. The contents of the intestines and the hooves are the only refuse of a slaughtered reindeer. From the intestines themselves the Lapp women prepare excellent sausages. The reindeer milk, again, is used in four different forms: as ordinary milk, as the sour milk preparation mentioned above, and in two kinds of cheese.

The hard work of the reindeer-herding business prevents the Lapps from mingling with the neighbouring peoples. Thus, the 'gentry' of the Lapps, the highland Lapps, have succeeded in preserving their race and tradition pure and unspoiled. The Lapp, Anta Pirak, in whose tent I stayed





Everard R. O. Koebel

A herd being driven into the enclosure. In the autumn camping-grounds in the lower mountains the 'segregation' can be carried out on a large scale



By courtesy of the Swedish Travel Bureau

As spring approaches, the Lapps leave the forest zone for the mountains, their children's cradles strapped to pack reindeer



Everard R. O. Koebel

Clothes and winter sledges are left near the spring grounds in stores called puogge



*By courtesy of the
Swedish Travel Bureau*

In the summer, among the forested lakes and rivers of Swedish Lapland, there are few Lapps to be seen, but in the winter the country near Lakes Sävajaure (above) and Sjabtjakaure (right) would be dotted with smoking kote



By courtesy of the Swedish Travel Bureau



By courtesy of the Swedish Travel Bureau

Aktse, in the northern part of the Jokkmokk district



By courtesy of the Swedish Travel Bureau

The spring, summer and autumn huts of certain of the North Swedish Lapps are made of peat. This is a typical summer camping-ground, so high as to be nearly treeless



The Suorva Lapps, another North Swedish people, retain their portable cloth-and-frame-work kote even in the summer camping-grounds

By courtesy of the Swedish Travel Bureau



By courtesy of the Swedish Travel Bureau

Mount Stuurra Skårkas : in a land where the only trees are small birch bushes and the wind is seldom still save towards midnight in summer, when this photograph appears to have been taken

for a month at the time I was studying Lapland, wrote a book in which he emphasized that, although impoverished Lapps get absorbed by the 'settled ones', nobody has been known to turn from settled life to nomad life. In spite of the Lapps not having constant homes as we 'settled ones' do, they maintain a tradition even older than ours. Their migration paths, nowadays about 100 or 150 miles in length, have for them the holy flavour possessed by everything that their ancestors once used. Their close and constant association with nature, climate, landscape

and animals, in addition to never being separated from the sky by a roof as we are, has preserved in them a wonderful spiritual power. It is, however, difficult to experience. Although modern methods of transport enable us to travel to Lapland within a few days, we are easily misled into taking the first Lapps we see at some tourist hotel as the real Lapps. And even if we are sportsmen enough to climb up to the summer camping-grounds the language problem will hinder us from coming into actual touch with the highland people. Even Swedish and Norwegian are very

rarely spoken by foreign tourists visiting Scandinavia, Lappish practically never.

The most astonishing phenomena the Lapps have produced are those of a psychical nature: witchcraft and Laestadianism. The former was connected with paganism, and has, unfortunately, become extinct with the progress of Christianity. In every district, however, the memory of the last wizard is still alive and cherished. Of these wizards a lot of unexplainable actions are recorded, such as ruling over wolves, telepathy of different types, prophecy, etc. Touches of these faculties seem still to exist with some old Lapp people. Thus I learned from an old Lapp woman that my father at home had fallen sick. She added, "He will not yet die". A week later, as a matter of fact, a letter from home with the bad news of

my father's illness reached me, and after another week my father died.

The old Lappish faith was a Shamanistic one, and readily produced certain degrees of ecstasy or trance in which the long-trained wizards were able to perform acts of magic entirely incomprehensible to our sceptical modern minds. It is not too difficult for anyone who knows the language to experience even nowadays among the Lapps something which, like the occurrence mentioned above, cannot be measured with our objective reasoning. Certainly paganism is extinct today, but in the remote highlands, far from clergy and civilization, sometimes things may still happen which may have more to do with the ancient magic than with modern church life.

Appealing to the Lappish predilection for ecstasy, a hundred years ago a Swedish clergyman, Lars Levi Laestadius, launched a religious movement of unique vigour and strength. It forms a fitting interpretation of Christianity for the temperament of the Lappish folk. At that time the Lapp people were seriously menaced by the abuse of alcohol. Laestadius succeeded within a short time in turning general drunkenness into complete abstinence. He further filled the people with optimism, and the proverbial serenity of the Lapps is said to have its origin in Lars Levi's disposition. A typical feature of all Laestadian assemblies is falling into ecstasy, a feature which also reveals the hysteric sensibility of the Lapp. The Laestadian ecstasy expresses itself in the so-called *likadusak*, by monotonous soundings, crying, and rhythmic movements.

On the summer camping-ground the Lapps do not stay long. Those who are camping in summer on Norwegian territory have nowadays permission to pass the frontier for one month a year only. There, usually, some 'segregations' of the herds take place. Besides guiding and guarding, the separations are the main work, as constant changes take place between the different



Everard R. O. Koebel

An Inari woman, a 'settled' Finnish Lapp, of a people who have taken to agriculture instead of herding reindeer



Everard R. O. Koebel

The reindeer herd of Anta Pirak, a Jokkmokk Lapp author, on the late autumn camping-ground. The four goats outside his kotc (below), which take part in the summer migration, are given as 'boarders' to the 'settled' Lapps during the winter half of the year

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Anta Pirak is here seen preparing the small l  h  k, as the Jokkm  k calls the covered sledge in which his most valuable possessions are locked up for transport

herds. Consequently, from time to time, Lapps from the different camps have to meet and to separate their animals.

On the autumn camping-ground, which is situated near the spring place, this is more easily done, as there spacious enclosures of birch can be prepared, at the side of which the 'segregation guests' build their special enclosures, the so-called 'offices'. Autumn is, in contrast to spring, the time of rest and sufficiency. The reindeer—except the bulls after rutting-time, which is in the autumn—are fat. The Lappish mosquito trouble comes to an end, and the herd does not evince the same urgent longing for distant tracts as it did in spring-time. But the weeks of resting must be industriously used in preparations

for winter, such as skin-sewing, meat-smoking, fishing and fish-salting. The pleasure of a sunny September or October is darkened by the approach of an inevitable natural catastrophe—the arctic winter with its manifold dangers for man and beast. The Lapps are not at all insensible to cold. I have heard some complain all the autumn, as the idea of suffering silently is unknown to them.

During the late-autumn migration down into the lowland forests, I was once employed as a servant—although a rather imperfect one. This I recognized as being the best method of studying both language and life. In slaughtering I could not do more than assist, as I had not succeeded in acquiring all the tricks. My

most trying duty—which indeed I did not like—was to run for many hours on skis collecting the herd. The new snow, however, facilitated collecting, since one was able to recognize by the tracks how widely the herd had spread, without losing any of those which had strayed farthest away, as usually happened in snowless times. Nor in lasso-throwing did I attain the proficiency of my employer, but I prided myself, at any rate, on being able to beat a fifteen-year-old Lapp boy in that art. The daily task during migration was to catch the twelve sledge reindeer and put them into the traces. Then I had to lasso the bell reindeer, take it on a halter and guide it to lead the herd, and, from time to time, to call in a loud voice, “Cooh—cooh”. Behind me, their leg sinews crackling as they went, the herd flowed—yes! ‘flowed’ is the right expression—followed by my master with his dog; and both teams of sledges—the

one guided by the tent mother, the other by her eleven-year-old daughter—brought up the rear. I had to go fastest in order that the herd could always see the single leader deer in front of it. Sometimes when the caravan during the night rushed over one of the frozen lakes, water had come up through the bursting ice. Immediately, it froze on the skis. These got heavy and would no longer glide. A few seconds later the same thing happened with the sledges, and we had to stop and scrape both skis and sledges. Those nights in solitude, occupied in the business of laying a trail for others and of leading the bell reindeer which the crowd was accustomed to follow, are glorious memories. The reward for all the pains and trials borne during my servant time, however, was a splendid one indeed—the unbounded confidence of unspoiled men of the wilds.



The following extracts are taken from Dr Hugo Adolf Bernatzik's book Lappland, which Messrs Constable are to publish. His unusual skill in photographing children, which was exemplified by the photographs of South Sea islanders published in The Geographical Magazine last November, is here shown in a very different environment

Lapp Children at Play

ON a little hillock stood the *kote* of the Pilto family. Father Pilto had a mischievous, roguish countenance and spoke very little. Whenever he was at home he would play with his little son Nils Anders, setting him on his knee, pulling his nose and looking at him lovingly. He could be gentle, too, with little Inga Maria, who was eleven months old and lay most of her time in her cradle. But one could see at once that Nils was his favourite.

Maria Pilto was a calm, kindly woman. She was the peaceful pivot around which the life of this exceedingly happy family revolved. Whether she was sitting on the floor of the *kote* rocking her baby's cradle or stirring the soup in the pot, whether she was talking about her children or putting the cradle on her back to go out and call on a neighbour for a little chat, she always looked friendly and contented. Marja, her eldest child, who was six years old, was remarkably like her; she played mother to a doll which her father had carved out of wood and which her mother's needlework had turned into a real little Karesuando Lapp.

Another family was the Utsis. Their youngest representatives—they were a family of eight—were Per and Paulus, lads of eight and ten years old, who were already impatient to go and look after the reindeer with their father. They would often help with the fishing and went by themselves out on to the lake, handling the heavy oars with skill. Then, when they got home, they would stuff dry grass, as the grown-up people did, into their little Lapp shoes.

In their spare time the children could do what they liked. They would play 'cat-and-mouse', laughing and shouting and slipping dexterously underneath each

others' raised arms. They would never let a boy be cat when a little girl was playing mouse; the mouse would be caught too soon.

When they were asked what their favourite game was all the children answered alike, "Playing at reindeer"; but then the reindeer is the boys' idol. Nothing excites them more, nothing occupies their thoughts more, nothing is so strong in them as the desire to grow up one day to be big enough to look after the herds properly.

It is a joy to watch, this game of the Lapp children. Some are reindeer, others the dogs, zealously barking and rushing up and down, while one plays the herdsman, whose job it is to catch the reindeer with his lasso and mark them. His lasso has the same carved ring and otherwise looks exactly like those of grown-up people, only its size is adapted to that of the little cowboy. He manages to throw it with astonishing skill. A head, an arm or a leg of one of the 'reindeer' is soon fast in the noose. When a boy is caught like this he struggles for all he is worth, and acts like a restive stag, lowering his head to strike and shaking his imaginary antlers. At last he falls to the ground or is dragged to earth by the 'herdsman'. The 'herdsman', setting himself astride the 'stag', subdues him until he makes no more movement and gives in, groaning under the weight of his vanquisher. Then the 'herdsman' draws his toy knife from his side, exultantly seizes his captive's ear from under his cap and pretends to cut it. When he is 'marked' the 'reindeer' is set loose again but he is separated from the rest of the herd: once he has been made prisoner he is out. There is no end to the fun and excitement of the game. If a girl



All photographs by Hugo A. Bernatzi

Maria Pilto is lacing together with coloured straps the leather that covers her little daughter's wooden cradle; the baby is holding a wooden doll, dressed in the clothes of the Karesuando Lapps, that her father has carved for her. He is playing with his favourite son Nils Anders





Per and Paulus Utsi always enjoy rowing the heavy boat out into the lake



The Utsis go out every day to inspect the fishing-nets which enclose the wide bays of the lake, and collect any char or trout that have got caught in them



'Cat-and-mouse' is a very popular game with the Lapp children. The boys' red woollen pom-poms bob merrily as they play



The best game of all is playing at reindeer. The lasso flies through the air just as it does at a real 'segregation'. One of the 'herdsmen' has got a 'reindeer' in his noose and has great sport with it! No amount of stamping and shouting can help the 'reindeer' now



The 'reindeer' is brought to the ground and has to be 'marked' on the ear with the 'herdsman's' toy knife. Early practice makes perfect!

is caught, she often begins to cry at the sight of the unsheathed knife threatening her. The boys are very careful not to hurt a girl 'reindeer', but if one of them does start crying they laugh contemptu-

ously and say that they much prefer playing the game without girls.

So the game the children play leads up to the real thing and the children grow up into fine herdsmen and their sturdy wives.

On the Move with the Lapps

THE broad river bed lies deep below us and the rapids glitter brightly in the sun. The man who is leading the trusty pack-reindeer goes on ahead. The current is strong and the water reaches up to his hips and he has to use all his strength to avoid being swept away. In one hand he holds the halter of the stag he is leading and in the other a long stick with which he cautiously tries the bed of the river in front of him. He avoids the rushing eddies and swings himself on, from one stone to another, supporting himself on his stick in the shallow places.

After a while the women and girls hand over the leading of the stags to the men who are to take them over, one batch after another. Cries ring unceasingly from one side to another, and with loud "Tjo-o-Hollos" the leaders urge their pack-reindeer forward. Their loads brush along the surface of the water and the current drags the animals into the deep places: enormous strength and presence of mind is needed to keep them out of the current and get them into a shallower part. The stags that carry the *kote*, in particular, have difficulty in holding to their courses, for the pressure of the water against the long tent poles increases the danger to an alarming degree.

Suddenly there is a tumult in mid-stream and the cries grow into a wild bellow. A stag has fallen down and the baggage on his back has already come loose and is being pulled off by the force of the stream. Two young fellows leap nimbly downstream with the help of their sticks and reach the rolling bundles and carry them on their backs to land. These

lads act splendidly. As soon as they have got to the other side with the heavy baggage they leap into the water again, make a woman or some young girl who is frightened get onto their backs and wade across again with them.

Five or six times each lad crosses the stream like this. Those of us who were carried over in this way are the best judges of what this means.

It was a good hour before at last all the men had assembled on the other side and had settled down for the usual rest and some coffee. But where could one get firewood in this treeless and barren land? The nomads knew at once what to do. A youth took from his coat some birch-bark, which burns like pitch, dug up the roots of some brushwood and soon a little flame was blazing merrily. Everybody took off their shoes, emptied the water out of them, rolled up their dripping leather gaiters and warmed their feet before the comforting open fire.

"Hoja, hoja, get up, the herd's coming!" Sunna Tuolja was beating violently on our tent. She woke us as she had got word of the approach of the reindeer. It was two o'clock in the morning and the midnight sun was high in the sky. A few minutes later we were outside and running through the swampy land and among the low birch bushes towards the great herd. Like an avalanche it seethed down the valley and was driven, to the accompaniment of deafening shrieks, to the edge of the lake. The grey mass of closely packed animals pressed on so fast that the herdsmen could only keep up with them with the greatest



The waterfall Stora Sjöfallet, in the gleam of the midnight sun



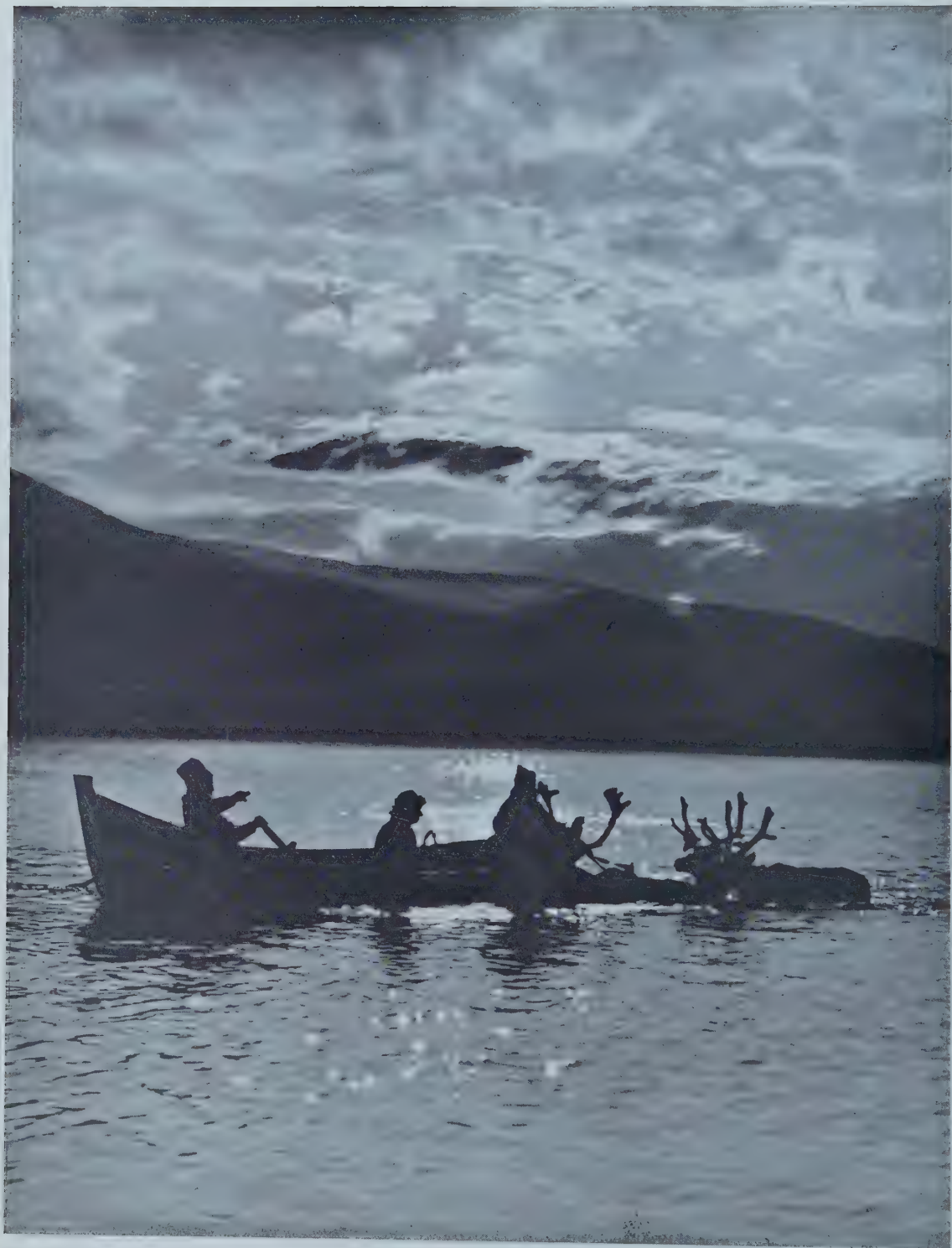
A reindeer stag which is being led across a lake has got into deep water in midstream and struggles with terror-stricken eyes against the force of the current



The reindeer, laden with the Lapps' belongings and dragging the poles that form the framework of the kote behind them, see the opposite bank at last and press forward, splashing up the water



Sometimes the heavy baggage is taken across in boats with the reindeer attached behind



Rowing over a lake under the midnight sun

difficulty. Some of the reindeer struggled apart and then were driven together again, some of the calves fell down, and an insane panic took possession of the herd.

But at length they were all assembled in the neck of land which reached out some distance into the lake. One of the guide-reindeer was tied to a boat. Three men got in and pushed out from the shore. The animal had to start swimming behind the boat whether it liked it or not. At the same moment the herdsmen raised a loud shout behind the herd, the dogs barked with all their might—and with a terrific surge, part of the herd plunged after the guide-animal into the foaming water. Soon all that could be seen were a few small streaks—the backs of the swimming animals—and their mighty horns, which towered like a forest out of the water.

The current, strong near the mouth of the lake, carried the herd with it. Some of the animals were seized with frantic terror. They turned round, and soon a large part of the herd was following their example. In desperation the Lapps jumped into the lake. Breast high they stood in the icy water and tried with shouts and the help of their long sticks to prevent the reindeer from landing. But some of the animals, their eyes distorted with

terror, scattered the herdsmen and raged back into the swamp. The others were diverted, struggled again against the stream and reached the opposite shore. A few calves had been forced some distance away and the anxious eyes of their owners followed the helpless young animals. Yet even they struggled safely to land in the end and rushed wildly off up the mountain slopes.

This exciting spectacle was enacted over and over again. The last time, Sunna rowed across with the guide-animal on a rein. None of the reindeer would follow it. So Sunna changed her guide-animal for an older one that had more 'authority' over the herd, and tried again. This time the herd followed.

Thus little by little the six thousand reindeer were assembled on the opposite bank. When an animal broke loose no one went after it but hoped that it would quieten down and follow the herd of its own accord. Only two small calves had to be caught and pulled into one of the boats and taken across.

The men breathed more easily. They stood on the shore inspecting the herd. The dogs were still excited, wagging their tails furiously. What fun it had been for them!

Paris as a University City

by ALAN H. BRODRICK

In mediaeval times Paris was one of the great international centres of learning, to which students came from all over Europe. Through the efforts of men like M. Deutsch de la Meurthe and M. Honnorat this position is now being restored; and the new Cité Universitaire will accommodate, under the most enviable conditions, students of every nationality, who will thus be enabled to measure their knowledge by the exacting standards of French scholarship, to avail themselves of the innumerable facilities for study which Paris affords and to breathe the spirit of a true 'university'

THE boulevard St Michel, in spite of its recent fame, is a parvenu street. The real road of the Left Bank of the quarter of the 'Schools' is the rue St Jacques, 'with its feet in Antwerp and Canterbury and its head in Rome', as a recent writer on Paris has put it. To walk up or down the rue St Jacques and the roads which are immediately to its right and left is to see practically all that remains of the Paris that was the centre of Occidental learning for centuries.

There is, alas, very little to remind us of what the great university buildings looked like. The University of Paris is the only great mediaeval foundation which has survived in a capital. Vienna and Prague are of the middle 14th century and Oxford and Salamanca, Padua and Cambridge were always provincial cities where the university was more important than the town. We can still trace what was their aspect hundreds of years ago, but in the case of the greatest of them all we are driven to prints and maps to get an idea of the Montagne Ste Geneviève in the great days of the Schools.

One glimpse of the Middle Ages we can get, and it is one of the most intriguing of all views in Paris. The Musée de Cluny—the ancient Paris home of the wealthy Abbots of Cluny in Burgundy—seen from just across the little square in front of the new Sorbonne, is very reminiscent of our older universities. The halls and chapels of the mediaeval colleges were, we may be sure, set behind such high walls. The lodgings of the students were of much less

lasting stuff and were mostly half-timbered houses of the usual town pattern.

Revolutions, wars and the inevitable building and rebuilding in a great city have left few traces of the past. Imagine what would have been the fate of a mediaeval university in London!

The wildest claims have been made for the antiquity of the University of Paris. It has been seriously maintained that it was founded by Charlemagne. In the light of modern research the facts seem to be that both Paris and Bologna began to take shape as universities about the same time and that the university of masters (Paris) as distinguished from the university of students (Bologna) was perhaps the slightly earlier foundation. The statutes of Paris appear, however, to have been definitely influenced by those of Bologna.

We may fix the formal foundation of the university at some time between 1150 and 1170. The first statutes date from 1208 and the first rector from much later. If a royal founder is needed, Philip Augustus (1165–1223) has as much right to be so regarded as any other King of France, for he consistently defended the masters and students against the cathedral authorities.

It is true that long before the reign of Philip Augustus there were professors who taught on the Ile de la Cité in the shadow of Notre Dame and under the close control of the cathedral authorities, but in time these teachers found the ecclesiastical authority irksome and they gradually moved across the river to the left bank,

where they put themselves under the protection of the powerful Abbot of the Abbey of Ste Geneviève (on the site where the Panthéon now stands) who was independent of the control of the Bishop of Paris.

The masters and their students soon formed an *imperium in imperio*—the 'pays latin'—with its own laws, tribunals and even speech. Its inhabitants were in constant conflict both with the cathedral authorities—who in spite of papal support for the university were persistent in claiming some sort of control over the faculties—and with the town authorities. There are many references in the documents to students being arrested by the Prévost of Paris and of the troubles which ensued. The violent disorders which have recently accompanied the efforts of Professor Jèze (the legal adviser of the Ethiopian Government) to deliver his lectures show that the Paris students can still be quite turbulent at times.

By 1255 the Abbot of Ste Geneviève was appointing a chancellor with power to confer a licence to teach—what we should today call a mastership of Arts.

The 13th century was the heyday of the Paris University. Its prestige was immense. It was the great centre of theological learning in the West, whose findings and decisions were everywhere respected. During this and the succeeding century it was regarded as the great moral force of France, comparable to the Papacy for Italy or the Imperial dignity for Germany.

At this time there were four faculties: three 'superior'—Theology, Canon Law and Medicine; one 'inferior'—Arts. The Faculty of Arts was divided into four 'nations' consisting of masters and students: (1) France: including French, Spanish, Italians and 'Greeks'—that is, subjects of the Eastern Empire; (2) Picardy: for those from north-eastern France and the Low Countries; (3) Normandy; (4) England: for English, Scotch, Irish and Germans.

At the head of each faculty was a dean





The Foundation (above), completed in July 1925 through the liberality of M. Emile Deutsch de la Meurthe, after whom it is named, was the nucleus of the University City that has become so notable a feature of Paris. Since then many 'national' houses, like that of Spain (below), have arisen

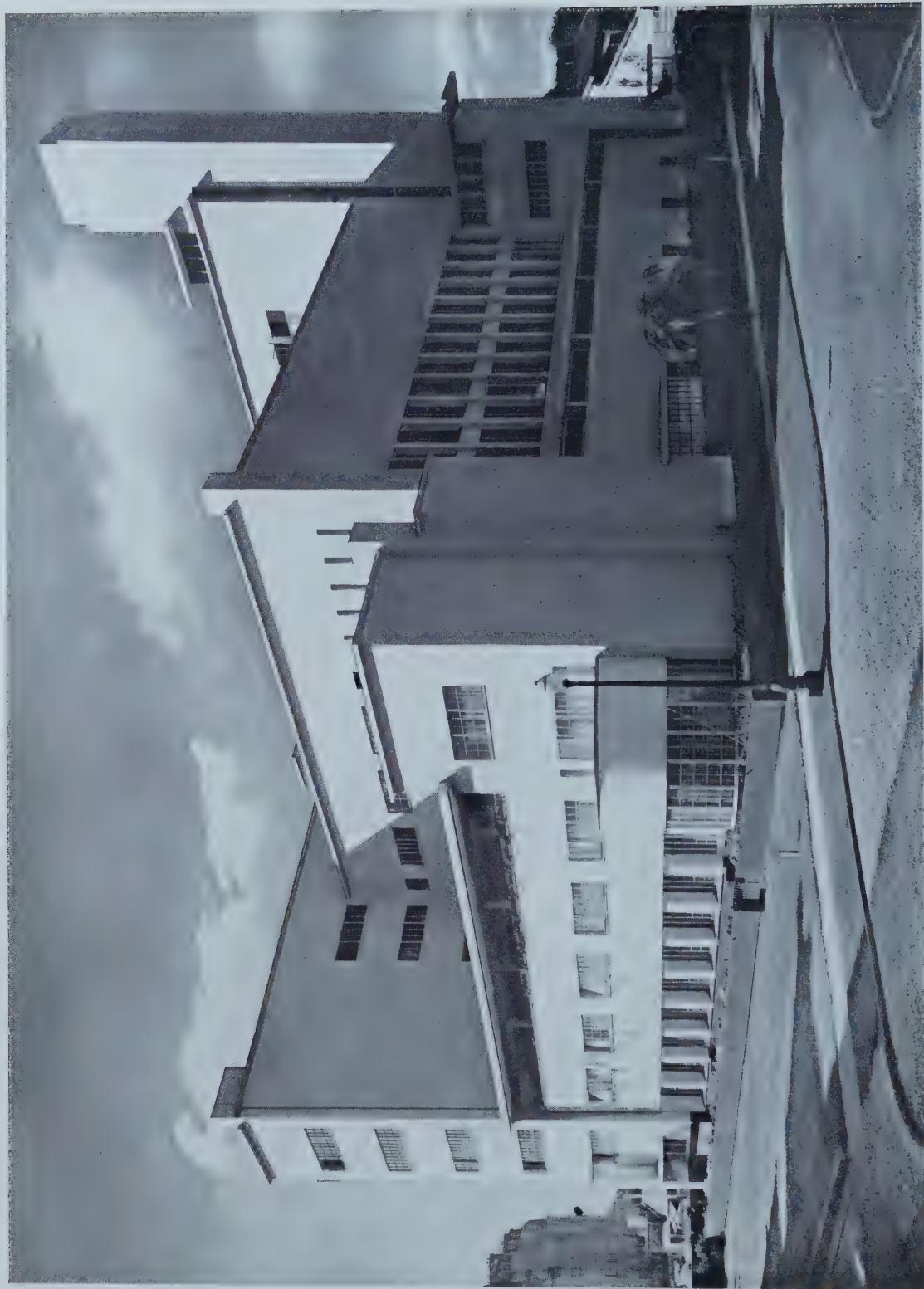




Although the majority of the colleges are designed for the nationals of individual countries, the Franco-British College (above), to be opened soon, will contain students of both nationalities, and the Indochinese Foundation (below), with its characteristic architecture, contains a few French students as well as Indochinese

L. Frédo





In many of the colleges a number of rooms are reserved for girl undergraduates, as in the Dutch College, opened in 1934



The unusual building of the Swiss Foundation was erected in 1933, largely with financial assistance from the Swiss Government



L. Fréon

The hall, made chiefly of glass, in the Swiss Foundation. The building contains fifty-two private rooms

and at the head of each nation a proctor (*procurateur*). The rector was originally the dean of the faculty of arts, who eventually came to be elected head of the whole university. It will thus be seen that the constitution of the university was autonomous in that it was free from outside control, although it was not democratic in the sense that the students had much voice in affairs. Only 'regents', that is to say, masters of arts actually engaged in teaching, had the right to be present at meetings and to vote. In this respect Paris was a contrast to the student-controlled universities of Italy and resembled our own older foundations. In the case of Paris, however, the system carried with it the seeds of its own destruction, for when the university had lost its independence—and the first great blows were struck at that independence by

Charles VII (1422–1461) who delegated to the *parlement* of Paris the right to judge between professors, students and university agents—it degenerated into a close oligarchy of civil servants whose conservatism was a byword. As early as the 16th century Francis I founded the Collège de France to shed the light of the new learning which the university so obstinately refused to recognize.

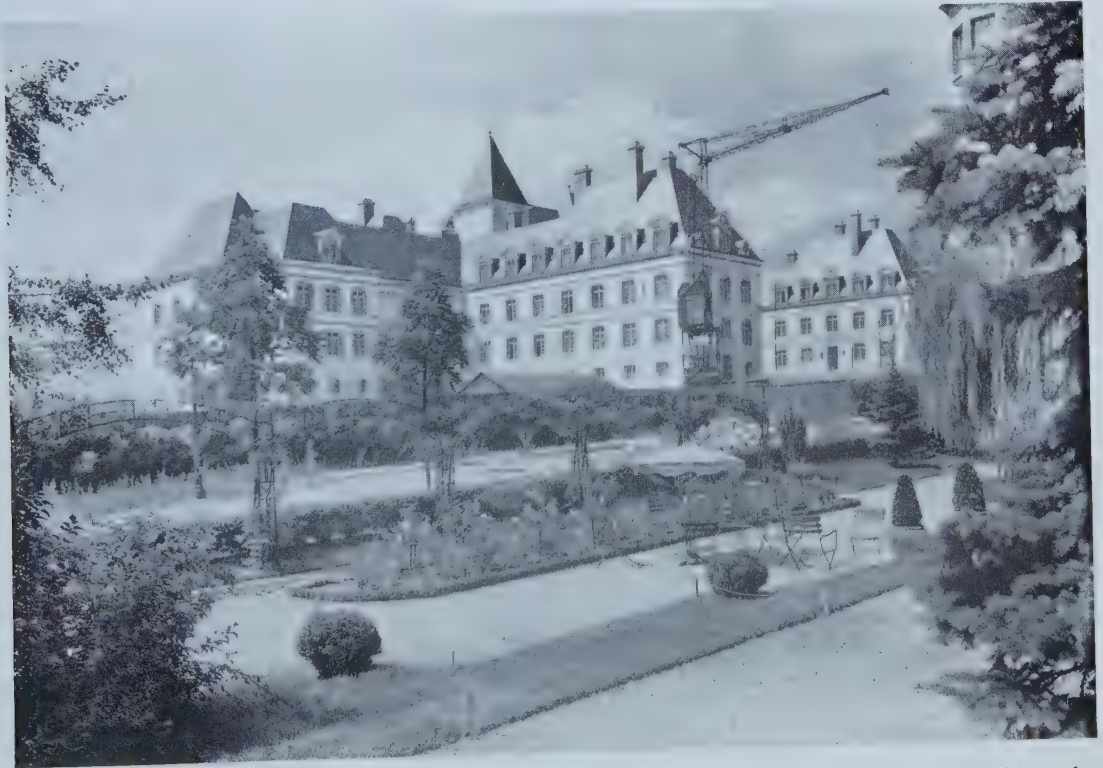
The students lived, as with us, in college. Before 1500 sixty-eight colleges were in existence. There was a Swedish college dating from 1315 which may be regarded as the spiritual ancestor of the Swedish foundation in the modern Cité Universitaire. The Scotch college was founded in 1326 by David, Bishop of Moray. There was no English college: it must be remembered that by the 14th century our own great universities were flourishing. We shall not

go far wrong if we suppose that during the 14th and succeeding centuries most of the undergraduates in the 'English nation' were Scots or Germans. The Hundred Years' War also acted as a powerful deterrent to Englishmen seeking a Paris education. When the war was over, the 'English nation' was generally known as the 'German nation,' either because there were so few English or because our name had become so unpopular.

Reference has already been made to the loss of independence which the university suffered during the 15th century; but its reputation and intellectual authority had already begun to decline during the period of the Great Schism in the preceding century, when the university was divided in its loyalty to the rival Papal claimants. The Wars of Religion hastened this decline and by the beginning of the

16th century its forty colleges were almost empty. The foundation of the *Académie française* by Richelieu and his refounding of the university gave a new impetus to studies in Paris, but the narrowly theological and ecclesiastical atmosphere of the Sorbonne, as the whole university had come to be called, precluded any real international character. This narrowness of outlook was perpetuated and even intensified after Richelieu's death by the Jesuits, who dominated university life in France during the later 17th and the 18th century.

So matters went on until the French Revolution in 1793 swept away the whole French educational system. The existing organization was established by Napoleon in 1805. The 'University of France' is an abstraction which is considered to be formed by the academies into which France



As the centre of the whole University City there has been built a great 'Maison Internationale', to be the meeting-place of all the City's inhabitants. It is due to be opened in May



Fiorillo



(Above) The reading-room of the main library in the 'Maison Internationale'. (Below) The entrance-hall of the new building

Fiorillo



Fiorillo

(Above) *The 'Salle des Fêtes'—the entertainment hall—of the 'Maison Internationale'*
 (Below) *The swimming-bath*



Fiorillo

is divided. The Academy of Paris is the present representative of the old University of Paris. Each academy has a rector at its head and all are under the Ministry of National Education.

During the 19th century the University of Paris more and more regained that international character which was hers in the Middle Ages. There are today (1936) over thirty thousand students inscribed on the registers of the university and of its affiliated special schools; about one-third of these undergraduates are foreigners.

The Paris University set up by the edicts of Napoleon was purely a teaching and examining centre with no corporate student life, but during the 19th century many Frenchmen cast envious eyes at our own older universities where had survived that college life which had altogether disappeared in France. Nothing was done, however; no funds were available and, above all, there was no site in Paris for building on the scale which would have been necessary.

Everyone who visited Paris up to about fifteen years ago, will remember the strange girdle of 'fortifications' with which the city used to be surrounded. These 'fortifications' consisted of a broad stretch of shabby grass raised above the level of the road and dropping to a species of dry moat on the far side where the moat merged into the dreary sordidness of the 'zone' of huts and shacks, since for three kilometres beyond the fortifications no permanent buildings might, for military reasons, be erected. Even before the war it had been decided to level this gigantic moat and to raze the various ugly brick 'bastions' which sprouted beside it at irregular intervals, and early in the nineteen-twenties the work, which even yet is not quite completed, was begun.

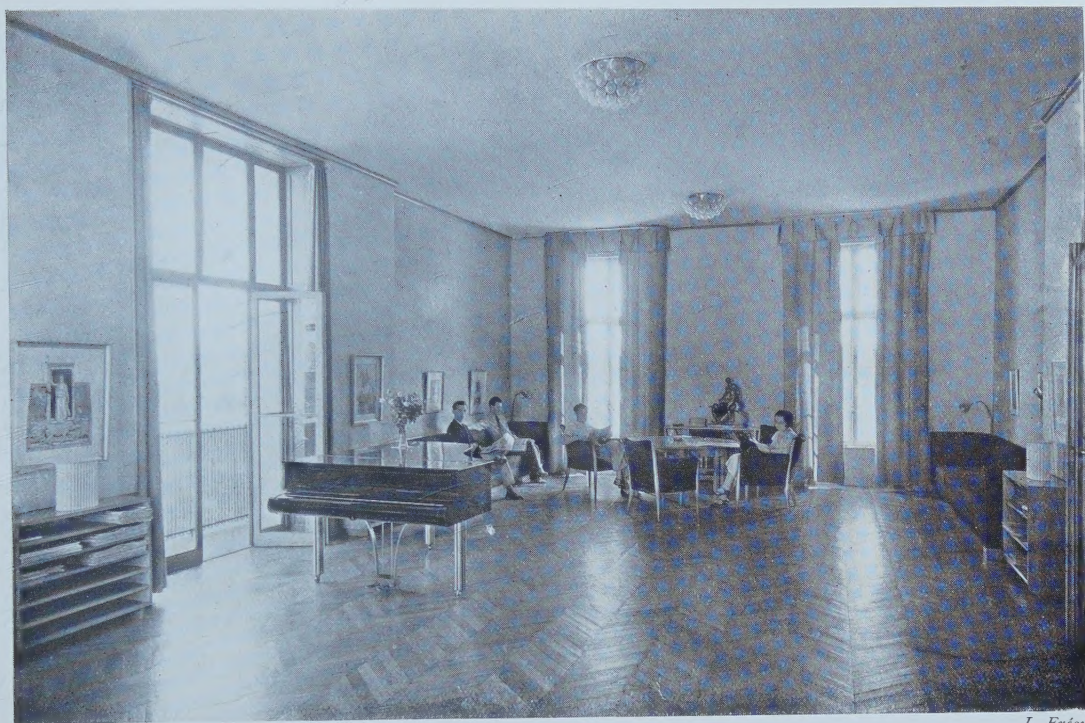
Then a very generous benefactor of the University of Paris, whose name is closely connected with the early history of aviation in France—M. Emile Deutsch de la Meurthe—presented to the Uni-

versity of Paris a large piece of ground on the site of the old fortifications in the south of Paris opposite the Parc de Montsouris. M. Deutsch de la Meurthe built on this ground the first complex of buildings of the *Cité Universitaire*—the University City. His foundation was opened in 1925 and consists of seven main buildings, one of which is reserved for girl undergraduates. There is room for about 350 students.

The history of the University City is thenceforth bound up with the name of M. André Honnorat, senator of the Basses Alpes and formerly Minister of Public Instruction. M. Honnorat is also famous as being the 'inventor', as far as France is concerned, of summer time. He has been throughout his whole career a great supporter of intellectual and moral co-operation between the nations and especially between his country and our own.

It is due to the untiring efforts of M. Honnorat and his collaborators that the University City has now a domain of more than a hundred acres running along the boulevard Jourdan to the south of Paris and for a great part of its length facing the Montsouris Park. A better site could not have been chosen, and it is right on the axis of the old rue St. Jacques where it left Paris 'for Rome'. This year the underground railway will have a station opposite the main building and the University City will be less than ten minutes from the Sorbonne.

The 'City' today consists of nineteen different foundations in addition to the main building which is nearly completed. This main building or *Maison Internationale*—erected largely owing to the lavish subventions of the Rockefeller Foundation—is a most extraordinary achievement. It is an enormous pile, to which our photograph does less than justice owing to the difficulty of photographing across the unfinished courtyard. The building is a beautiful modern



L. Fréon

Light and air are characteristic of all the new buildings. The 'common-room' of the Danish Foundation (1932)

realization of a Louis XIII palace. The style was chosen largely because the golden age of Richelieu is that of the rebirth of the university after the disasters of the religious wars. There are two blocks on the boulevard joined by a colonnade: to the left, the administrative building; to the right, the medical centre, where every resident undergraduate will have to submit to a rigorous examination before he is admitted, where he will undergo periodical overhauls and where he will receive treatment when ill. The main block lies back beyond a large courtyard. In this principal building are a library, a theatre, swimming-baths, a gymnasium, a film library, a cinema, dining-rooms, cafeterias, ballrooms, suites of rooms for guests, a post office and a bank.

As it stands at present the University City can house about three thousand students and it is intended that they should

be the pick of those studying in Paris. In theory, at least, the national foundations are reserved for students of those nationalities and some of the foundations are reserved for French undergraduates. At the present time about half the inmates are foreigners and applications for rooms are carefully scrutinized. There are always more applications than rooms available. The authorities of the Cité do not plan the studies of those in the various houses. Some of them are working for a French degree, some are following the courses at the special schools; they must come recommended by the school or faculty at which they are inscribed and produce a number of other attestations as to their morality and intellectual standing. Each case is considered by a commission whose decision is final. It is hoped in this way to secure the very best representatives of the youth of all nations.



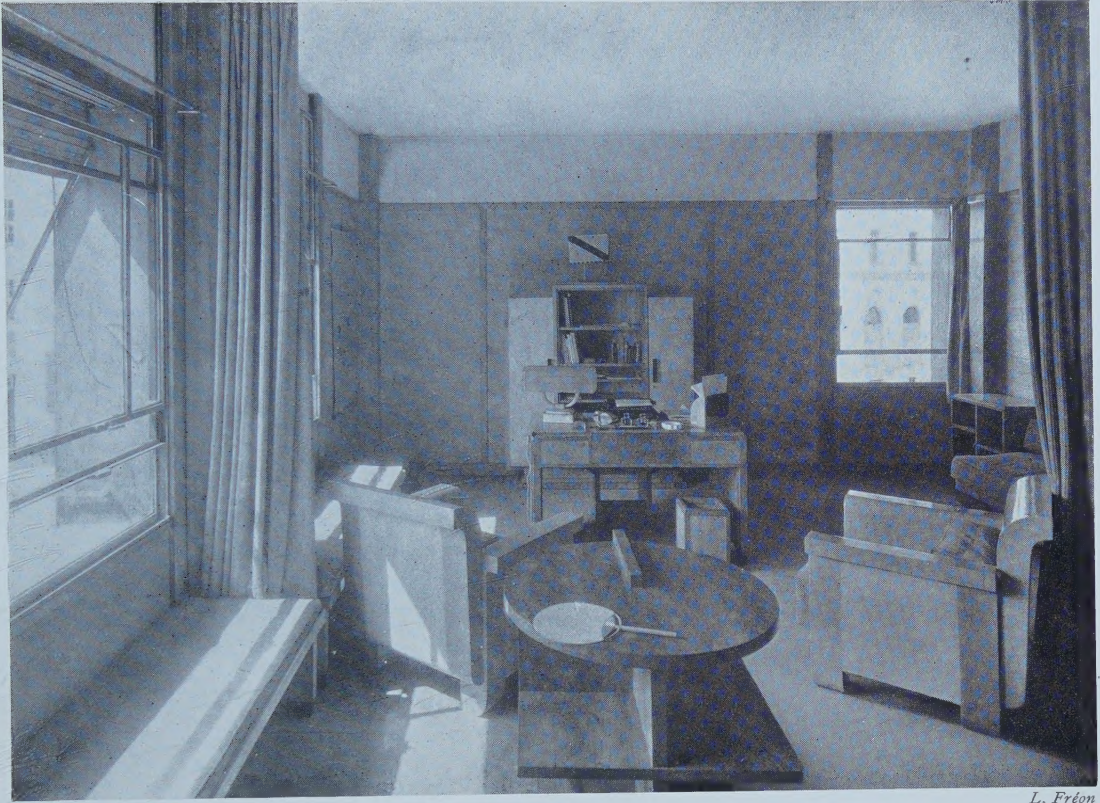
The rooms in the colleges are as cheap as they are pleasant. This student's room in the 'Maison des Provinces de France' costs little more than £3 per month L. Freon

It must be remembered that there are over thirty schools, faculties and institutions of learning depending on the University of Paris and that these are scattered over quite a large area—they range from the Collège de France to the Odontotechnical School, from the Catholic Institute of Paris to the Museum of Natural History. Residence at and enjoyment of the privileges attached to membership of the Cité Universitaire is extended to all those for whom there is room and who are considered suitable, provided they are regularly inscribed as students at some institution of higher learning in Paris.

During the Long Vacation the various foundations receive students from other schools and universities in France or abroad who may wish to study or read in Paris during the summer months.

The Collège Franco-Britannique is not yet quite finished but it is a large airy building in the style made familiar by many modern school buildings in England. The Canadian foundation, which has been open for some years, is a charming building of an unexpectedly southern character. The Swedish and Danish houses are very pleasing examples of modern northern architecture. The Swiss and Dutch are ultra-modern and, although interesting enough, there is nothing specifically national about them. The Spanish and Cuban foundations, on the other hand, are both in the style of the late 16th century and it is worth while comparing the differences in interpretation of this style in the two buildings.

The house of the Indochinese students is in traditional Annamese manner—



L. Fréon

A room in the Japanese Foundation (which owes much to the generosity of M. Satsuma) displays a tendency, common in Japan today, to interpret traditional Japanese decoration in a cubist manner

up-curved roofs, dragon finials and ochre-coloured walls. The Satsuma Foundation—the Japanese house—is in many ways a compromise—such as are common in Japan today—between the east and the west. There is, as yet, unfortunately no Chinese foundation.

The Armenian college and the Hellenic foundation show clearly their nationalities, but the architectural tradition of Armenia, which is purely ecclesiastical, is perhaps not well adapted to treatment of what is almost from its size an office-building. The house of the Argentine students is a pleasant, simple white building of beautiful proportions. The *Maison des Provinces de France*, the original Deutsch de la Meurthe foundation and the United States college are less striking architecturally.

In these houses undergraduates find

sunny, warmed rooms with every comfort—much more comfort than undergraduates enjoy in our older universities—for prices varying from 200 francs (less than £3 at the present rate of exchange) for a room without breakfast at, say, the Deutsch de la Meurthe foundation, to 400 francs a month (less than £6) at the Canadian, Japanese or Cuban foundations; there is no higher price.

There are, as yet, only four foundations where girl undergraduates are admitted—the Deutsch de la Meurthe, United States, Danish and Dutch houses—but it is part of the policy of the board of the Cité that more room should be placed at the disposal of women.

If one wants to get an idea of the international character of the Cité, one has only to go to the temporary restaurant. It is



L. Fréon

The library of the Cuban College. Chess may well be a favourite diversion among the students, inspired by the example of their compatriot Capablanca!

housed on the north side of the boulevard Jourdan in the sort of hutment the war familiarized us with. Here about three thousand meals a day are served, and an excellent luncheon or dinner costs only from 5 to 8 francs. All colours, creeds and tongues are here to be seen and heard and they mingle more than would perhaps be possible elsewhere, for Paris is a town where race and colour prejudice are almost unknown. When the restaurants and cafeterias in the main building are

working, many thousand meals a day will be served.

The Cité Universitaire is completing the University of Paris. Undergraduates of the new generation not only find in Paris an incomparable centre of learning and teaching but they have also the possibility of learning in conditions which will help to make them citizens of the world, for they meet on equal terms all manner of men, all inspired by the same ideal—knowledge without prejudice.